

**Remarks**

The Examiner has objected to claim 1 because the word "having" at line 2 should be "comprising". Claim 1 has now been amended accordingly. The Examiner has also objected to withdrawn claims 21 and 22 as depending from a cancelled claim. Claims 21 and 22 have now been cancelled.

It should also be noted that claim 1 has been amended to include the subject matter of claims 3 and 6-8. Claims 3 and 6-8 have therefore been cancelled.

The Examiner has rejected claims 1-11 under 35 USC 102(b) as being anticipated by US Patent No. 6,383,106 to Kashiwase (hereinafter Kashiwase). It is respectfully submitted that the claims, as amended, distinguish over the Kashiwase reference. More particularly, claim 1 clearly relates to a drive system for driving implements attached to a vehicle by way of a power take off. Power take offs are used in agricultural and industrial applications to drive implements that are attached to and pulled by the vehicle. ASAE Standard S203.14, attached hereto as Exhibit A, defines a power take off, PTO as "An external shaft on the front or rear of the tractor to provide rotational power to implements". Similarly Webster's dictionary defines a power take-off as "a supplementary mechanism on a truck or tractor enabling the engine power to be used to operate nonautomotive apparatus" (See attached Exhibit B). Kashiwase clearly does not disclose any kind of power take off as so defined. The element 5a of Kashiwase cited by the Examiner as being the power take off shaft is in fact a drive shaft that inputs to a CVT transmission that powers the drive wheels of the vehicle. This element is neither an external shaft for providing rotational power to implements nor is it for operating nonautomotive apparatus. There is nothing in the Kashiwase disclosure that suggests that this shaft is a PTO in the normal meaning of the term. Similarly, there is nothing in the Kashiwase reference to suggest that the motor 2 can be driven indirectly by the engine. Further Kashiwase does not disclose a brake for stopping the power take off shaft (Kashiwase does not disclose a power take off). The wheel brakes which the Examiner asserts are inherent in the Kashiwase disclosure are not disclosed as being controlled by the controller, nor does the release of the brake allow the first

electrical machine, the second electrical machine and the combination gearbox to be combined to an infinitely variable torque division gearbox for the power take-off shaft as per claim 10. Contrary to the Examiners assertion in the "Response to Arguments" section at page 6 of the Final Action, column 3 lines 41-45 of Kashiwase does not disclose that the controller controls the brake as claimed. The Kashiwase reference simply states that:

*The driver's intention determining system 11 **detects depression operation of accelerator pedal and brake pedal**, and steering angle, **thereby determining driving operation condition** dependent on the operation of the driver. **The vehicle control condition determining system 12 determines brake pedal depression condition**, control quantity for the engine and the ABS (Anti-lock Braking System), and operating conditions of lights, an air conditioner and others. The driving condition determining system 13 determines the change of driving conditions such as vehicle speed, ascending and descending, and road surface conditions.*

*In dependency on outputs of those systems, the monitor and control system 10 **controls operations of the engine 1 and motors 2 and 4, the oil pressure in cylinders 5f of the CVT 5, the charging of a battery 14.***

Accordingly, Kashiwase does not control the brake but simply senses the condition of the brake and uses this information to **control** the operation of the engine and motors 2 and 4, the oil pressure in cylinders 5f of the CVT 5, the charging of a battery 14.

The Examiner has also rejected claims 1-5 as being anticipated by US Patent 6,607,466 to Bordini. Because claim 1 has now been amended to include the subject matter of claims 6-8, not rejected under Bordini, it is submitted that claims 1-2 and 4-5 are now distinguishable over the Bordini reference. More particularly, Bordini does not disclose a brake for stopping the PTO or a control system as claimed.

In conclusion, it is believed that this application is in condition for allowance,

Application No. 10/786,534  
Amendment Dated 8 August 2006  
Reply to Office Action of 8 May 2006

and such allowance is respectfully requested.

Any fees or charges due as a result of filing of the present paper may be charged against Deposit Account 04-0525. Two duplicates of this page are enclosed.

Respectfully,

  
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ASAE S203.14 FEB04

## Front and Rear Power Take-Off for Agricultural Tractors



American Society of Agricultural Engineers

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# Front and Rear Power Take-Off for Agricultural Tractors

*Originally developed in 1926 by a conference of engineers representing tractor manufacturers; adopted by ASAE April 1927; revised July 1928, March 1931, August 1941, June 1952; revision submitted by the Farm and Industrial Equipment Institute; approved by the ASAE Power and Machinery Division Standards Committee 1958, 1961, June 1964, June 1966, December 1966, December 1967, December 1968, December 1969; revised editorially March 1973; reconfirmed December 1974; revised and combined with ASAE S204.6, 1000-RPM Power Take-Off for Agricultural Tractors, March 1976; revised March 1978, January 1982; reconfirmed December 1986; revised March 1990, February 1991; revised editorially September 1991, April 1993; revised March 1994; reaffirmed December 1994, December 1995, December 1996, December 1997, December 1998, December 1999, January 2001, December 2001, February 2003; revised February 2004.*

## 1 Purpose and scope

1.1 This Standard specifies a suitable means of mechanical power transmission from the tractor to the implement, and promotes dimensional interchangeability of tractors and towed implements with the same type power take-off (see table 1).

1.2 This Standard provides dimensions relating to the tractor front and rear power take-off shaft, and power take-off shield.

1.3 This Standard provides specifications for the splined power take-off shaft and the mating connector.

1.4 This Standard establishes and defines type 1, 2, and 3 power take-off shaft (see table 1).

1.5 The successful performance of all tractor and implement combinations likely to be met in field service requires consideration of factors other than the dimensional relationships provided in this Standard.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision,

and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Standards organizations maintain registers of currently valid standards.

ANSI/ASAE S318.10 JUL93, *Safety for Agricultural Equipment*  
ASAE S207.12 MAR94, *Operating Requirements for Tractors and Power Take-Off Driven Implements*  
ASAE S482 MAR94, *Drawbars—Agricultural Wheel Tractors*

## 3 Definitions

**power take off, PTO:** An external shaft on the front or rear of the tractor to provide rotational power to implements.

## 4 Specifications

4.1 The tractor rear PTO shaft is classified into three types and shall conform to the specifications shown in figures 1, 2, 3, and 4 and table 1. The front PTO shaft shall conform to the dimensions shown in figures 1 and 3 and the type 2 portion of table 1.

4.2 The location of both front and rear tractor PTO shafts shall be within the limits of 25 mm (1 in.) to the right or left of the tractor centerline, with the centerline being the recommended location.

4.3 The direction of PTO shaft rotation shall be:

- Rear PTO—clockwise when facing in the direction of forward travel;
- Front PTO—clockwise when facing the projecting end of the shaft.

4.4 A means to indicate when the PTO shaft is operating at standard speed shall be provided on tractors capable of driving the 540 r/min shaft in excess of 600 r/min and the 1000 r/min shaft in excess of 1100 r/min.

4.5 Tractors capable of driving the 540 r/min shaft in excess of 630 r/min and the 1000 r/min shaft in excess of 1170 r/min shall also include a suitable warning of operation in excess of those speeds.

4.5.1 If a shiftable PTO is provided, a means shall be employed on the

Table 1 – Power take-off shaft dimensions\* (see figure 1)

		Type 1	Type 2	Type 3
Nominal diameter		35 mm (1 3/8 in.)	35 mm (1 3/8 in.)	45 mm (1 3/4 in.)
standard operating speed-r/min		540 ± 10	1000 ± 25	1000 ± 25
A	Groove to end of shaft	38.1 (1.50) ± 0.8 (0.03)	25.4 (1.00) ± 0.8 (0.03)	38.1 (1.50) ± 0.8 (0.03)
B	Effective spline length with relation gage, min	76.2 (3.00)	63.5 (2.50)	88.9 (3.50)
C	Chamfer	7.1 (0.28) ± 0.8 (0.03)	4.8 (0.19) ± 0.8 (0.03)	7.6 (0.30) ± 0.8 (0.03)
D	Chamfer angle	0.5 rad (30 deg) ± 0.5 (3.0)	0.5 rad (30 deg) ± 0.5 (3.0)	0.5 rad (30 deg) ± 0.5 (3.0)
E	ID of groove	29.46 (1.160)	29.46 (1.160)	37.34 (1.470)
		29.26 (1.152)	29.26 (1.152)	37.13 (1.462)
F	Radius of groove	6.86 ± 0.25	6.86 ± 0.25	8.38 ± 0.25
		(0.270 ± 0.010)	(0.270 ± 0.010)	(0.330 ± 0.010)
G	Spherical clearance radius on tractor, min	82.6 (3.25)	82.6 (3.25)	101.6 (4.00)
H	Location of center of clearance radius	0.0	12.7 (0.50)	0.0
J	Break sharp corner of chamfer	Yes	Optional	Optional

\*Dimensions are in mm (in.) except where indicated otherwise.

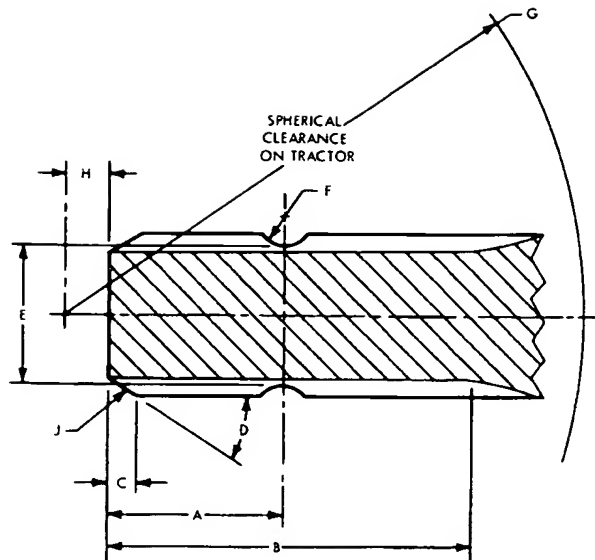


Figure 1 - Power take-off shaft (see table 1) The circumferential groove is provided for a locking means in the implement hub. Effective spline length, B, to be heat treated for surface durability (within Rockwell C 48-56)

tractor to prevent over speeding of a type 1 tractor PTO shaft in excess of 630 r/min, or type 2 tractor PTO shaft in excess of 1170 r/min.

4.6 The tractor PTO shield shall conform to ANSI/ASAE S318. Tractor PTO shield dimensions shall conform to figures 6 and 7.

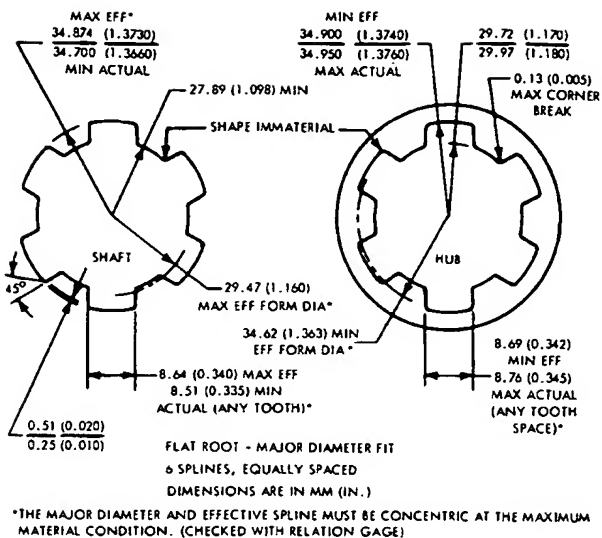


Figure 2 - Type 1 power take-off 540 r/min—35 mm (1 3/8 in.) diameter—straight side spline dimensions

4.7 Dimensions associated with the drawbar shall conform to ASAE S482.

4.8 Dimensional association between the tractor power take-off shaft, drawbar, and implement input connection, IIC, shall conform to ASAE S207.

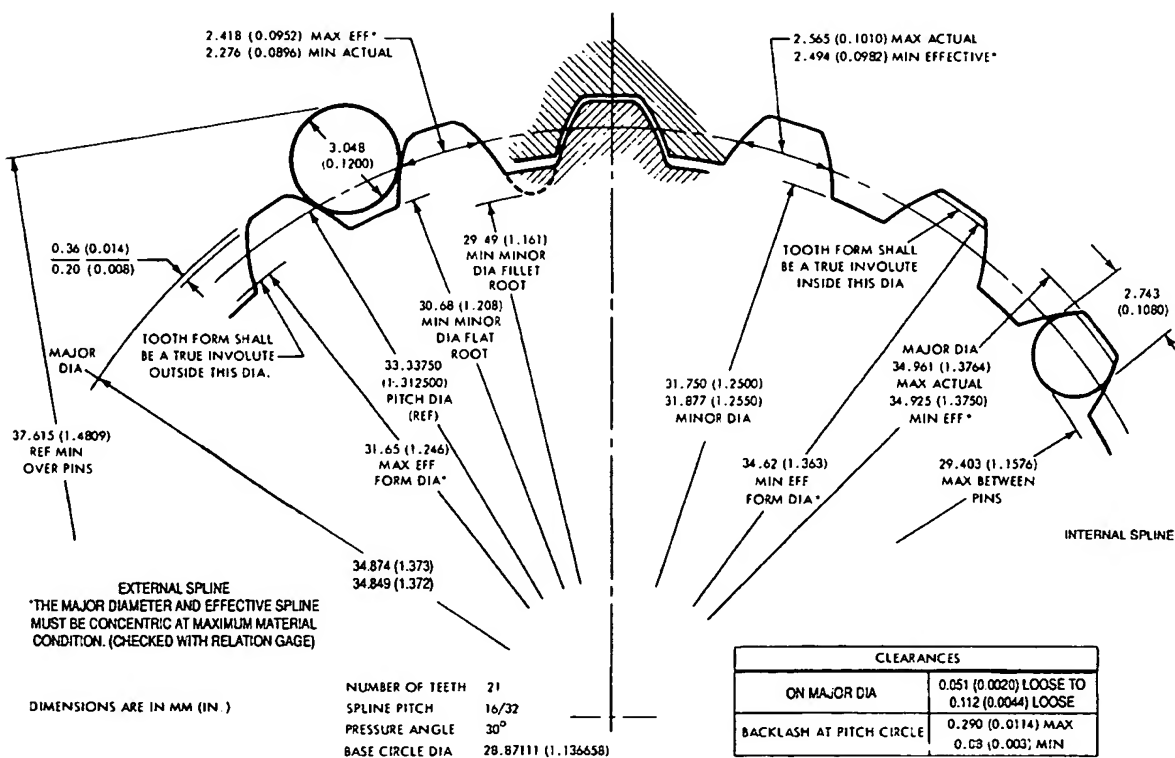


Figure 3 - Type 2 power take-off 1000 r/min—35 mm (1 3/8 in.) diameter—involute spline dimensions

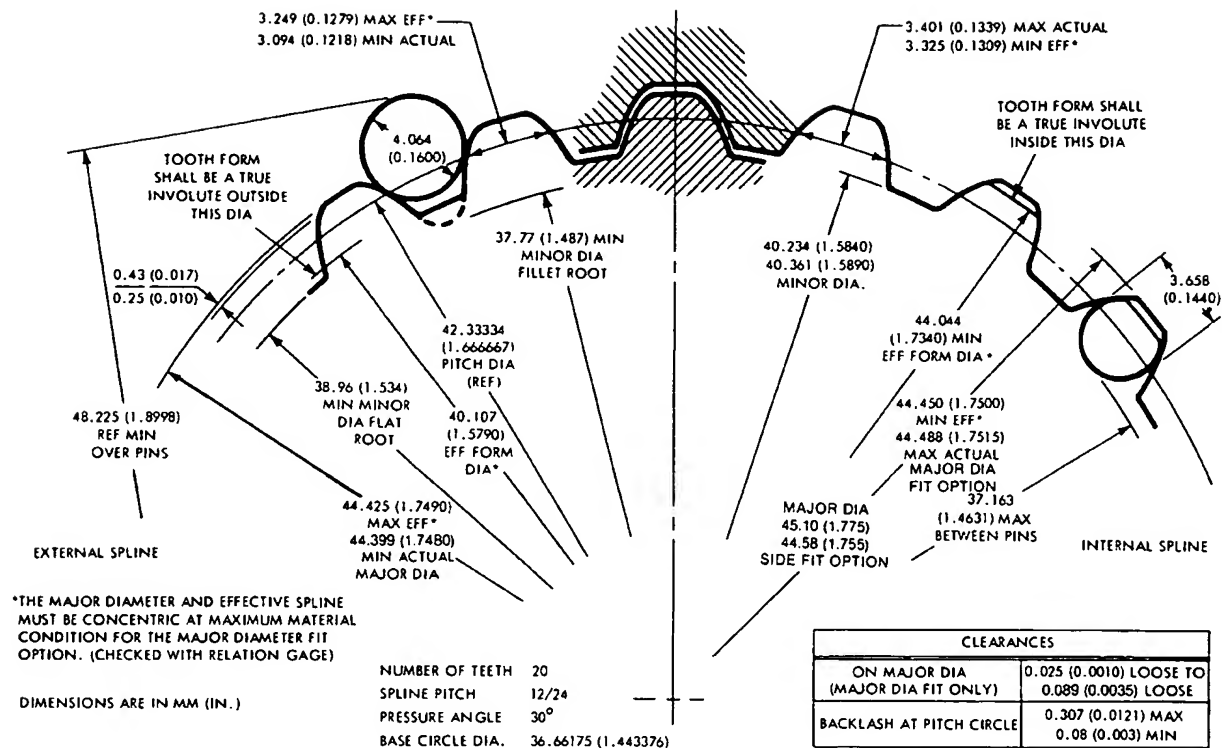


Figure 4 – Type 3 power take-off 1000 r/min—45 mm (1 3/4 in.) diameter—involute spline dimensions

Table 2 – Location of PTO (see figure 5)

PTO type	h min	h max
1	530 (21) <sup>1)</sup>	800 (31)
2	530 (21)	820 (32)
3	600 (24)	910 (36)

<sup>1)</sup>May be reduced to 350 mm on tractors with a minimum track setting of 1150 mm or less.

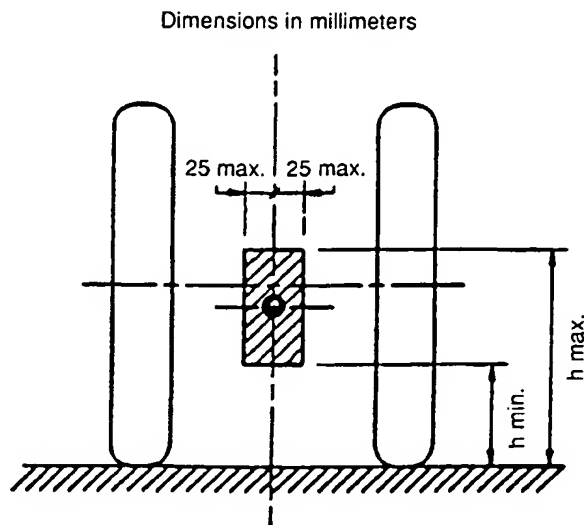


Figure 5 – Location of PTO

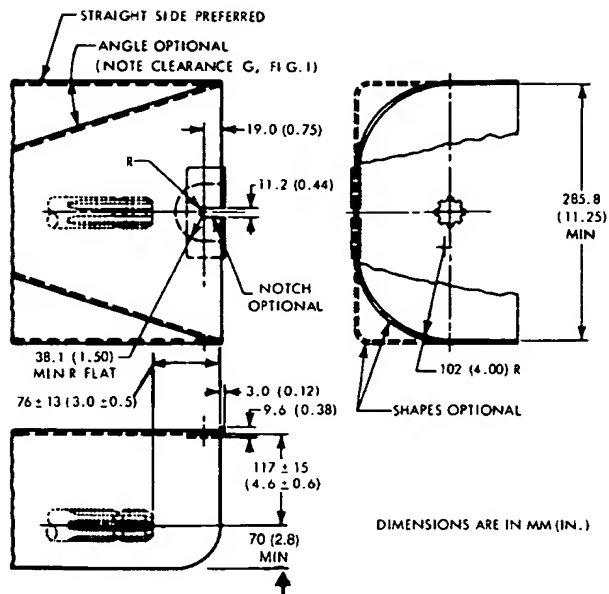


Figure 6 – Power take-off shield for tractor with types 1 and 2 PTO

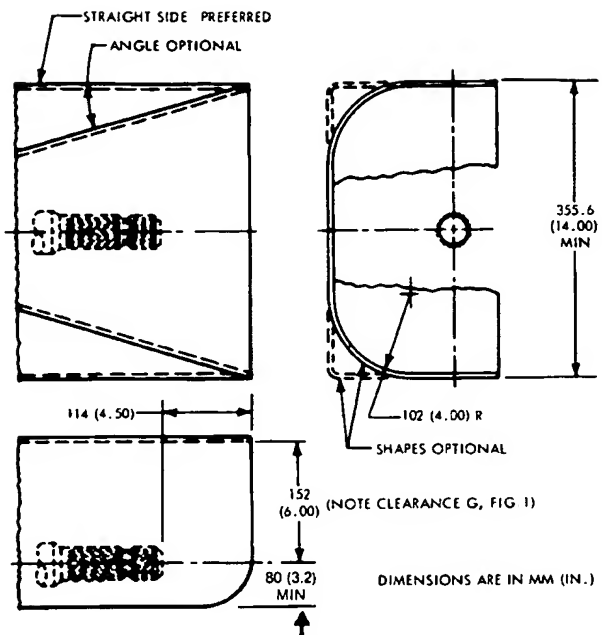


Figure 7 – Power take-off shield for tractor with type 3 PTO



EXHIBIT B

# Webster's Seventh New Collegiate Dictionary

*A Merriam-Webster*  
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BASED ON  
WEBSTER'S  
THIRD  
NEW INTERNATIONAL  
DICTIONARY



G. & C. MERRIAM COMPANY, *Publishers*  
SPRINGFIELD, MASSACHUSETTS, U.S.A.

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NUMBER 2 **6 a** : a source or means of supplying energy; **esp** : ELECTRICITY **b** : MOTIVE POWER **6** : the time rate at which work is done or energy emitted or transferred **7** : MAGNIFICATION **2b** **8** : SCORE, COMPREHENSIVENESS

**SYN** POWER, FORCE, ENERGY, STRENGTH, MIGHT mean the ability to exert effort. POWER may imply latent or exerted, physical, mental, or spiritual ability to act or be acted upon; FORCE implies the actual and efficacious exercise of power; ENERGY applies to power expended or capable of being transformed into work; STRENGTH applies to the quality or property of a person or thing that enables him to exert force or withstand strain, pressure, or attack; MIGHT implies great or overwhelming power or strength

**SYN** POWER, AUTHORITY, JURISDICTION, CONTROL, COMMAND, SWAY, DOMINION mean the right to govern or rule or determine. POWER implies possession of ability to wield coercive force, permission of authority, or substantial influence; AUTHORITY implies the granting of power for a specific purpose within specified limits; JURISDICTION applies to official power exercised within prescribed limits; CONTROL stresses the power to direct and restrain; COMMAND implies the power to make arbitrary decisions and compel obedience; SWAY suggests the extent or scope of exercised power or influence; DOMINION stresses sovereign power or supreme authority

**power vt** : to supply with power **esp** . motive power

**pow-er-boat** \-'bōi/ **n** : MOTORBOAT

**power drive n** : a dive of an airplane accelerated by the power of the engine — **pow-er-drive** \-'div/ **vb**

**pow-er-ful** \-'pau(-ə)-fəl/ **adj** **1** : having great power **2** : leading to many or important deductions (— set of postulates) — **pow-er-ful-ly** \-'(-ə)-lē/ **adv**

**pow-er-house** \-'pau(-ə)-'hauz/ **n** **1 a** : an electric utility generating and the source of influence or inspiration **2** : one having or wielding great power

**pow-er-less** \-'les/ **adj** **1** : devoid of strength or resources **2** : lacking the authority or capacity to act : UNABLE — **pow-er-less-ly** **adv** — **pow-er-less-ness** **n**

**power mower n** : a motor-driven lawn mower

**power of attorney** : a legal instrument authorizing one to act as the attorney or agent of the grantor

**power pack n** : a unit for converting a power supply (as from a battery) to a voltage suitable for an electronic device

**power plant n** **1** : POWERHOUSE **la** **2** : an engine and related parts supplying the motive power of a self-propelled vehicle

**power play n** : an offensive maneuver (as in football or hockey) in which mass interference is provided at a particular point or in a particular zone

**power politics n pl** **but sing or pl in constr** : politics based primarily on the use of power as a coercive force rather than upon ethical precepts; **esp** : international politics characterized by attempts to advance national interests through coercion on the basis of military and economic strength

**power series n** : an infinite series whose terms are successive integral powers of a variable multiplied by constants

**power shovel n** : a power-operated excavating machine consisting of a boom or crane that supports a dipper handle with a dipper at the end of it

**power steering n** : automotive steering with engine power used to amplify the torque applied at the steering wheel by the driver

**power take-off n** : a supplementary mechanism on a truck or tractor enabling the engine power to be used to operate nonautomotive apparatus (as pumps or saws)

**pow-wow** \-'pau,-wau/ **n** [of Algonquian origin; akin to Natick *pauwau* conjurer] **1** : a No. American Indian medicine man **2** : a No. American Indian ceremony (as for victory in war)

**pow-wow vt** : to call a get-together **b** : a meeting for discussion

**powwow vi** : to hold a powwow

**pox** \-'pɔks/ **n** , **pl** **pox** or **pox-es** [alter. of *pocks*, pl. of *pock*] **1 a** : a virus disease characterized by pustules or eruptions (chicken *pox*) **b** *archaic* : SMALLPOX **c** : SYPHILIS **2** : an afflictive rash : PLAQUE (*a* ~ on him)

**2pox vi, archaic** : to infect with a pox and esp. with syphilis

**poz-zo-la-na** \-'pɔt-sə-'liən-ə/ or **poz-zo-lan** \-'liən/ **n** [It *poz-zolana*] : a pulverulent siliceous or siliceous and aluminous substance that reacts chemically with slaked lime at ordinary temperature and in the presence of moisture to form a cement — **poz-zo-la-nic** \-'liən-ik/ **adj**

**PPI** \-'pɛ,-(-)pɛ-'ti/ **n** [plan position indicator] : a radar scope on which spots of light representing reflections of radar waves indicate the range and bearing of objects

**prac-tic** \-'prak-tik/ **adj** [ME *practik*, fr. MF *practique*, fr. LL *practicus*] : PRACTICAL

**prac-tic-a-ble** \-'prak-ti-kə-'blɪ-ət-ē/ **n** : the quality or state of being practicable

**PRAC-tic-a-ble** \-'prak-ti-kə-'blɪ/ **adj** **1** : possible to practice or perform : FEASIBLE **2** : capable of being used : USABLE — **PRAC-tic-a-ble-ness** **n** — **PRAC-tic-a-ble-ly** \-'blɪ/ **adv**

**SYN** PRACTICABLE, PRACTICAL both mean relating to practice or use but are not interchangeable. PRACTICABLE applies to what has been proposed and seems feasible but has not been actually tested in use; PRACTICAL applies to things and to persons and implies success in meeting the demands made by actual living or use **SYN** see in addition POSSIBLE

**PRAC-ti-cal** \-'prak-ti-kəl/ **adj** [LL *practicus*, fr. Gk *praktikos*, fr. *prassein* to pass over, fare, do; akin to Gk *peran* to pass through] : more at **FARE** **1** : actively engaged in some course of action or occupation **2 a** : of, relating to, or manifested in practice or action (for ~ purposes) **b** : being such in practice or effect : VIRTUAL (*a* ~ failure) **3** : capable of being put to use or account : USEFUL **4 a** : disposed to action as opposed to speculation or abstraction **b** (1) : qualified by practice or practical training (2) : designed to supplement theoretical training by experience **6** : concerned with voluntary action and ethical decisions (— reason) **SYN** see PRACTICABLE — **PRAC-ti-cal-i-ty** \-'prak-ti-'kal-ət-ē/ **n** — **PRAC-ti-cal-ly** \-'prak-ti-k(-ə)-lē/ **adv** — **PRAC-ti-cal-ness** \-'kol-nəs/ **n**

**practical art n** : an art (as woodworking) that serves ordinary or material needs — **usu.** used in pl.

**practical joke n** : a joke whose humor stems from the tricking or abuse of an individual placed somehow at a disadvantage — **practical** **JOKE** **n**

**practical nurse n** : a nurse that cares for the sick professionally without having the training or experience required of a registered nurse

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